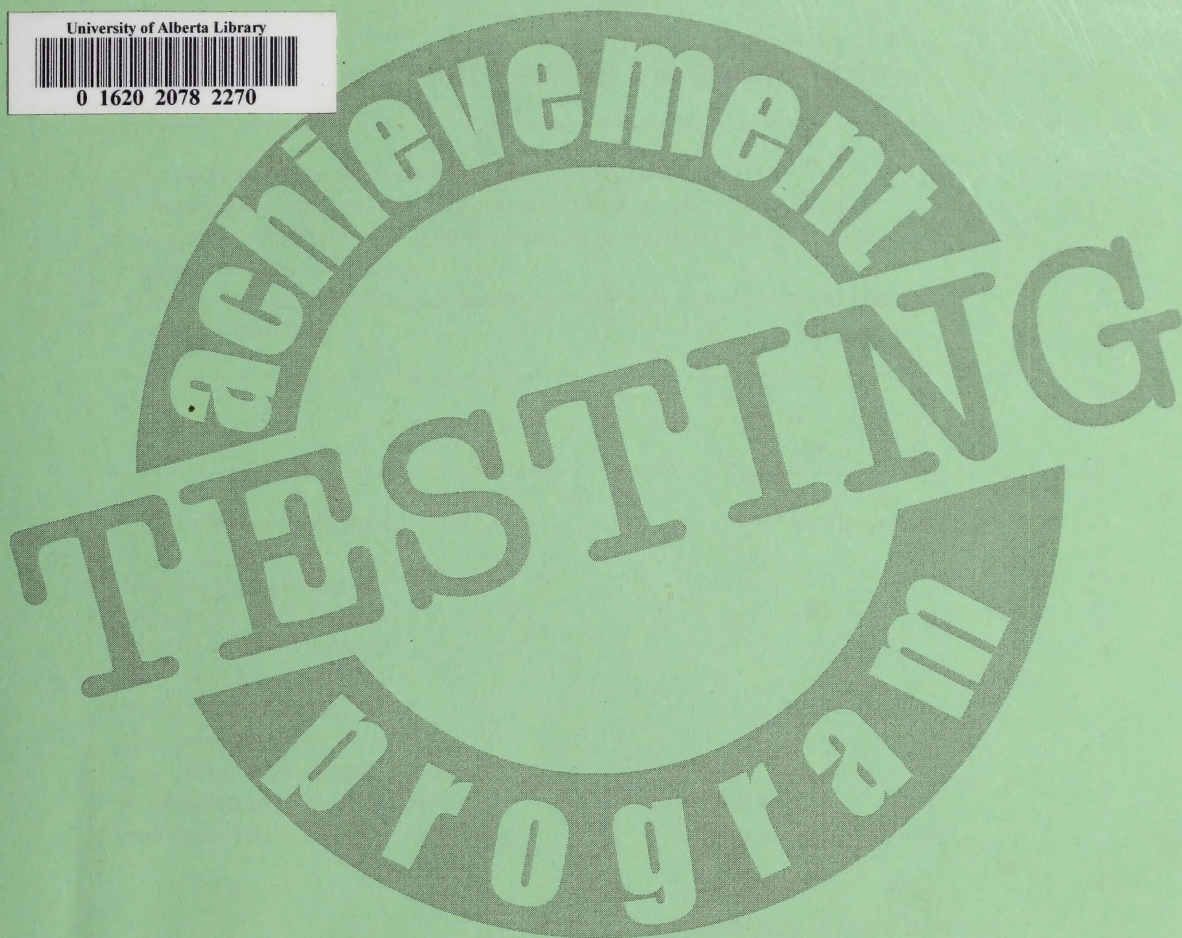


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Information Bulletin

• Grade 6 Science •

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Distribution: This document is posted on our web site. Our Internet address is <http://ednet.edc.gov.ab.ca>.

This bulletin contains general information about the Achievement Testing Program and information specific to the Grade 6 Science Achievement Test. **This bulletin replaces all previous bulletins.**

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September 1999

Achievement Testing Program Purpose

The purpose of the Achievement Testing Program is to

- determine if students are learning what they are expected to learn
- report to Albertans how well students have achieved provincial standards at given points in their schooling
- assist schools, jurisdictions, and the province in monitoring and improving student learning

Enhance Student Learning

Careful examination and interpretation of the results can help identify areas of relative strength and weakness in student achievement. Teachers and administrators can use this information in planning and delivering relevant and effective instruction in relation to learning outcomes in the *Programs of Study*.

Enable Accountability

Alberta Learning and school jurisdiction personnel are responsible for ensuring that high-quality education is provided to all students in the province.

Information about achievement is provided to

- schools and jurisdictions
- parents
- the public

so that they may know how well students in their schools are meeting local targets and provincial expectations.

Interpreting Results

Achievement tests assess only part of what is to be learned. In addition, many factors contribute to student achievement. Personnel at the jurisdiction and school levels are in the best position to appropriately interpret, use, and communicate jurisdiction and school results in the local context.

General Information

The Achievement Testing Program provides teachers, parents, students, school administrators, Alberta Learning, and the public with information about what students know and can do in relation to provincial standards. Group results are reported at school, district, and provincial levels to improve learning opportunities for students.

The assessments are administered in two subject areas in Grade 3—language arts and mathematics—and in four subject areas in grades 6 and 9—language arts, mathematics, social studies, and science.

The assessments are based on provincial standards, which reflect important learnings in the subject areas listed above. Classroom teachers from across the province are extensively involved in developing, field testing, and marking the assessment instruments. Teachers are also involved in setting assessment standards.

Reporting the Results

On August 25, 1999, each jurisdiction and school connected via extranet received, electronically, individual school reports and jurisdiction reports regarding their students' achievement, as well as guidelines for interpreting these results in relation to provincial standards.

To facilitate reflection on school programs, we expect that results will be shared with all school staff (not just teachers of grades 3, 6, and 9), as well as with parents and the community.

Two copies of an individual profile for each student will be sent to the school that the student will attend in September. We expect that the Parent Copy will be given to parents and the School Copy will remain with the student's record.

Administering the Tests

Information about the nature of the provincial assessments as well as their administration to students requiring special provisions can be found in the *General Information Bulletin, Achievement Testing Program*, which is distributed to all school principals and is posted on the Alberta Learning web site <http://ednet.edc.gov.ab.ca>.

Principals should refer to the *Principal's Manual* for specific information regarding schedules, security, rules, responsibilities, policies, and the administration of all achievement tests.

Teachers can refer to the *Teacher's Manual* for specific information regarding procedures for administering all achievement tests and the local marking of the written response for Language Arts achievement tests.

Students in Francophone and French Immersion Programs

All students in Francophone and French Immersion programs must write English Language Arts, French Language Arts, and French versions of other achievement tests if their language of instruction is French. Alberta Learning will send a checklist to schools in January requesting an indication of how many English or French tests are required. These forms must be returned through jurisdiction offices by mid-February.

**The following achievement tests are secured:
ALL tests from 1998 and 1999**

Standards: Curriculum, Assessment, Achievement

Definitions

The Achievement Testing Program is directly concerned with three different but related standards. These provincial standards are curriculum standards, assessment standards, and achievement standards.

- **Curriculum Standards** are the expected student learnings sequenced into grade levels. They include broad statements of knowledge, skills, and attitude expectations against which student performance is judged. These standards are established in the process of curriculum development and are found in the *Programs of Study* document produced for each subject.
- **Assessment Standards** are the criteria adopted for judging actual student achievement relative to curriculum standards. They are ultimately expressed in and applied to test scores. They are derived from answers to questions such as: what scores must a student obtain or how many questions on a given test must a student answer correctly in order for his/her performance on the test to be judged as acceptable or excellent?
- **Achievement Standards** are judgements that specify what percentages of students are expected to achieve an acceptable and an excellent level of achievement in relation to each course of studies; i.e., to the relevant curriculum standards. They reflect a community judgement about what is an appropriate expectation for students. It is important to point out that this judgement is not a prediction of the percentage of students who will actually achieve acceptable or excellent levels, but rather a specification of the percentage of students at a given grade or year in school

who are *expected* to achieve the acceptable (85%) or excellent level (15%). **The 85 % of students expected to meet the acceptable standard includes those students who meet the standard of excellence.** These standards apply to school, jurisdiction, and provincial performance.

Local Targets and Planning

A target is an implicit part of any goal. A school's educational goals point the directions for people's efforts, but targets describe in specific terms what will be accomplished by a certain time. This allows people to assess whether they are heading where they intend to go, and how well they are moving toward their desired outcomes. Assessment of progress in relation to a target may also lead to the recognition that a different target would be more helpful in guiding a school's or jurisdiction's efforts toward a particular goal. By identifying immediate, reachable outcomes, targets encourage teachers, students, administrators, and their community to believe that distant goals are attainable.

Viewed in this way, targets can be a valuable part of a school board's education plan. The mission, mandate, values and beliefs, and long-range goals all provide a context for setting specific targets. Similarly, past accomplishments are helpful indicators of what specific targets may be most appropriate. This is why achievement test results, as well as results of various other local assessments, are relevant in target setting.

Focus

District targets for student achievement on the provincial achievement tests are a required part of a school board's education plan. These district targets provide a framework for each school in the district to use in setting local targets. However, the setting of specific targets by each school is necessary as part of a plan of action and as a

basis for assessing the effectiveness of local decisions about programs. District targets will be most helpful if they reflect the variations identified by the local targets set by individual schools.

Systematic interpretation of school results from provincial achievement tests will reveal where students need more help in order to continue learning successfully. This can be the beginning point for setting local targets for student performance on the tests in the next year or two. The provincial expectation that at least 85% of students will achieve the *acceptable standard* on each test indicates the long-term goal, but staff in each school should identify what percentage of their students reasonably can be expected to achieve the provincial standard on a particular test in a given year. An important part of this decision is agreeing on how resources and people can support the priorities that have been set locally.

Tips for Setting Local Targets

- Consider past and desired participation rates in achievement tests when setting targets for student performance on specific tests.
- Focus on a limited number of areas. For example, emphasize one or two subjects in which weaknesses in student performance are across grades. It may be reasonable to set “hold the line” targets in other areas temporarily.
- Work collaboratively across grades in a school. Students’ performance on an achievement test reflects their learning over the years. Teachers in all grades can contribute important insights and assistance in setting targets.
- Use the school reports on achievement test results to identify which aspects of a subject need attention, and use this information to plan targets.
- Emphasize what students need in order to succeed, rather than focusing on problems that keep students from achieving at the levels expected provincially.

- Expect to set different targets in different grades and subjects, depending on past results and current priorities and resources.
- Work collaboratively at the district level, to identify areas of common strength or weakness across different schools and to determine targets for the district that can support all schools.
- Interpret targets for students so that they are part of the school-wide effort to achieve school targets. Inform parents, too.
- Report to students and parents on student achievement in relation to targets.

Targets in Perspective

Provincial tests, though providing a common standard and important information about students’ learning, are only one of many indicators that should be used to evaluate the effectiveness of schools. School boards and individual schools may find it helpful to set targets related to other measures of student achievement and to areas other than student achievement. Examples of these include completion of programs, satisfaction reported by students or parents, collaboration of parents or others from the community, student involvement in the community, and other types of indicators reflecting local educational goals.

Through its targets, each school board or school, together with parents and members of the community, can highlight priorities that exist locally for a given year and can commit to achieving certain results. Insofar as target setting complements other strategies for improving student learning, targets are likely to contribute to student learning and to the overall effectiveness of schooling in the community.


Purpose of Assessment Standards

The provincial standards are the basis upon which we assess how well students have learned English Language Arts and Mathematics by the end of Grade 3, and English Language Arts, Mathematics, Science, and Social Studies by the end of

Grade 6 and Grade 9. These standards reflect the essential learnings that all Alberta students are expected to achieve. Provincial standards are useful, therefore, for assessing grades 3, 6, and 9 students in all types of school programs—public, private, and home education. By comparing actual results with provincial standards, decisions can be made about whether achievement is, in fact, “good enough.”

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Grade 6 Science Assessment

General Description

The Grade 6 Science assessment consists of 50 multiple-choice questions. The questions are placed in real-life contexts. Frequently, a number of questions may be clustered around a common context. Students record their answers on a separate answer sheet.

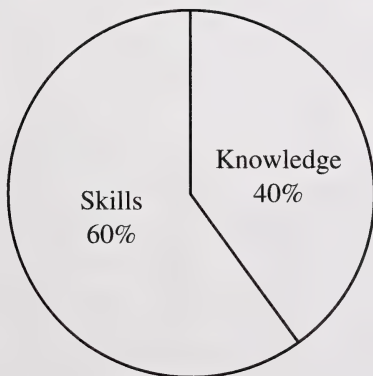
The test is developed to be completed in 60 minutes; however, students may take an additional 30 minutes to complete the test.

Students require HB pencils, erasers, and scrap paper. Calculators are not required for successful completion of the assessment but are permitted.

Reporting Categories

The assessment is limited to those areas of learning that may be efficiently assessed using paper and pencil.

Knowledge and skill components are integrated in the assessment. Knowledge is the fundamental understanding of the concepts and the processes of science. Skills refer to the application of knowledge. The following circle graph shows the approximate emphasis for the reporting categories of knowledge and skills.



Questions on the assessment will have contexts drawn from the following topics:

Air and Aerodynamics
Flight
Sky Science
Evidence and Investigations
Trees and Forest

To assist students in understanding the possible contexts and specific science terms that may be used in the test, teachers should ensure that students are familiar with the meaning of the following words and phrases.

departure	constellations
terminal	asteroid
vertical	clear-cut
horizontal	visibility
descending	accomplish
plaster cast	infer
monitor	suspects
horizon	door jamb
dumpster	deciduous
helicopter	coniferous
cylinder	intervention
variable	sanctuaries
cross-section	drought
photosynthesis	propelled
chlorophyll	nozzle
hectares	interpretive center
silhouette	counter-clockwise
cluster	emit
drooping	erosion
annual	distress
perennial	cadet
self-supporting	grubs
compressed	analyze
decompose	manipulated variable
scavenger	responding variable
consult	independent variable
satellite	dependent variable
diminish	

Description of the Science Assessment Standards

The following statements describe what is expected of Grade 6 students who are meeting the *acceptable standard* or the *standard of excellence* based on outcomes in the Program of Study. These statements represent the standards against which student achievement is measured. It is important to remember that one test alone cannot measure completely all of the outcomes in the Program of Study.

Acceptable Standard

Students who meet the *acceptable standard* in Grade 6 Science can design and carry out an investigation in which variables are identified and controlled, and which provide a fair test of the question being investigated. They recognize the importance of accuracy in observation and measurement, and apply suitable methods to record, compile, interpret, and evaluate observations and measurements. They can also design and carry out an investigation of a practical problem involving the construction or modification of a device that moves through air, and they can develop a possible solution.

Students who meet the *acceptable standard* can describe the properties of air and the interactions of air with objects in flight. They can construct devices that move through air, and identify adaptations for controlling flight. These students can observe, describe, and interpret the movement of objects in the sky, and identify pattern and order in these movements. They can apply knowledge of the properties and interactions of materials to an investigation and identification of a material. They can also describe characteristics of trees and the interaction of trees with other living things in the local environment.

Students achieving the *acceptable standard* demonstrate positive attitudes for the study of science and for the application of science in responsible ways.

Standard of Excellence

Students who meet the *standard of excellence* in Grade 6 Science can design, carry out, and evaluate an investigation in which variables are identified and controlled with ease. The investigation provides a fair test of the question being investigated and the student readily identifies new questions that may also be explored. They are accurate in making observations and measurements, and in applying novel methods to record, compile, interpret, and evaluate observations and measurements. They can also design, carry out, and evaluate an investigation of a practical problem involving the construction or modification of a device that moves through air, and they can develop a workable solution.

Students who meet the *standard of excellence* can describe in detail the properties of air and the interactions of air with objects in flight. They can construct aerodynamic devices that move through air, and identify and make adaptations for controlling flight. These students can observe the movement of objects in the sky, make detailed descriptions and accurate interpretations about these movements, and identify specific patterns of them. They can apply knowledge of the properties and interaction of materials with precision. They can provide clear descriptions of the characteristics of trees and the interaction of trees with other living things in the local environment.

Students achieving the *standard of excellence* demonstrate positive attitudes for the study of science and for the application of science in responsible ways. They demonstrate confidence in their personal ability to learn and develop problem-solving skills, perseverance in the search for understanding, and critical-mindedness in examining evidence and determining what the evidence means.

Blueprint

The emphasis for the achievement test is based on the learning expectations as presented in the blueprint.

General Learner Expectations	Reporting Category Emphasis By Number of Questions (%)		Total Number of Questions (%)
	Knowledge	Skills	
Students are expected to:			
Work cooperatively with others to design and carry out an investigation in which variables are identified and controlled; recognize the importance of accuracy in observation and measurement, and apply suitable methods to record, compile, interpret, and evaluate observations and measurements gathered by self and group; work cooperatively with others in designing and carrying out an investigation of a practical problem and in developing a possible solution	2 (4)	12 (24)	14 (28)
Describe properties of air and the interactions of air with objects in flight; construct devices that move through air; identify adaptations for controlling flight	9 (18)	5 (10)	14 (28)
Observe, describe, and interpret the movement of objects in the sky; identify pattern and order in these movements	4 (8)	3 (6)	7 (14)
Apply observation and inference skills to recognize and interpret patterns, to distinguish a specific pattern from among a group of similar patterns and to apply a knowledge of the properties and interactions of materials to the investigation and identification of a material sample		6 (12)	6 (12)
Describe characteristics of trees and the interaction of trees with other living things in the local environment	5 (10)	4 (8)	9 (18)
Total Number of Questions (%)	20 (40)	30 (60)	50 (100)

Note: Some contexts may also be drawn from learnings accumulated through grades 4 and 5. The number of questions on the test may vary slightly from those indicated in the reporting category.

Preparing Students for the Science Test

The best way to prepare students for writing the achievement tests is to teach the curriculum well and to ensure that children know what is expected. Many of the skills and attitudes that support test writing are in fact good skills and strategies for approaching all kinds of learning tasks.

Have students do the sample questions included in this bulletin. Then, have students share the strategies they used to answer the questions.

Share the following information with your students to help them prepare for the Grade 6 Science Achievement Test.

Suggestions for Answering Multiple-Choice Questions

- Before you begin, find out:
 - how much time you have
 - if you can use a calculator
- Ask questions if you are unsure of anything.
- Skim through the whole test before beginning. Find out how many questions there are and plan your time accordingly.
- Answer the easier questions first, then go back to the harder ones.
- Do not spend too much time on any one question. Make a note (*or ?) beside the question and go back to it if you have time.
- Read each question carefully, underline key words, and try to think of an answer before looking at the choices.

- Read all the choices and see which one best fits the answer.
- When you are not sure which answer is correct, cross out any choices that are wrong, then pick the choice that is best.
- Guess if you don't know the right answer. Answer all questions—there is no penalty for guessing.
- If time permits, recheck your answers.
- Double check to make sure you have answered everything before handing in the test.
- Notice that the questions on the science test are organized in narrative themes.
- Read the information given using the strategy that works best for you. You should either
 - look at all the information and think carefully about it before you try to answer the questions **OR**
 - read the questions first and then look at the information, keeping in mind the questions you need to answer.
- Make sure you look at all forms of the information given. Information may be given in words, charts, pictures, graphs, and maps.
- When information is given for more than one question, go back to the information before answering each question.
- Check your work when you calculate an answer, even when your answer is one of the choices.

For further suggestions, see *Teaching Students with Learning Disabilities*, Alberta Learning, Special Education Branch, pages LD 122 to 124.

Sample Test

The following sample questions reflect the nature and complexity of the questions that will appear on the Grade 6 Science Achievement Test.

Teachers are encouraged to familiarize their students with the types of questions that will appear on the achievement test by having them work through the sample questions.

This collection of sample questions does not represent the test emphasis as presented in the blueprint.

A sample answer sheet for the multiple-choice questions is provided so that students can familiarize themselves with this form.

A table of the key and descriptors for the sample questions is found on page 21.

For more samples of the various types of multiple-choice questions, refer to previous Grade 6 Science Information Bulletins.

Sample Instructions

- You may use a calculator but it is not necessary.
- Make sure that the number of the question on your answer sheet matches the number of the question you are answering.
- Read each question carefully and choose the **correct** or **best** answer.

Example

This test is for

- A. mathematics
- B. science
- C. language arts
- D. social studies

Answer Sheet

Ⓐ ● Ⓒ Ⓓ

- Use **only** an **HB** pencil to mark your answer.
- If you change an answer, **erase** your first mark **completely**.
- Try to answer all the questions.
- **You may write in this booklet, if you find it helpful. Make sure answers are placed on the answer sheet.**

Sample Answer Sheet

MULTIPLE CHOICE	
1 (A) (B) (C) (D)	16 (A) (B) (C) (D)
2 (A) (B) (C) (D)	17 (A) (B) (C) (D)
3 (A) (B) (C) (D)	18 (A) (B) (C) (D)
4 (A) (B) (C) (D)	19 (A) (B) (C) (D)
5 (A) (B) (C) (D)	20 (A) (B) (C) (D)
6 (A) (B) (C) (D)	21 (A) (B) (C) (D)
7 (A) (B) (C) (D)	22 (A) (B) (C) (D)
8 (A) (B) (C) (D)	23 (A) (B) (C) (D)
9 (A) (B) (C) (D)	24 (A) (B) (C) (D)
10 (A) (B) (C) (D)	25 (A) (B) (C) (D)
11 (A) (B) (C) (D)	26 (A) (B) (C) (D)
12 (A) (B) (C) (D)	27 (A) (B) (C) (D)
13 (A) (B) (C) (D)	28 (A) (B) (C) (D)
14 (A) (B) (C) (D)	29 (A) (B) (C) (D)
15 (A) (B) (C) (D)	30 (A) (B) (C) (D)

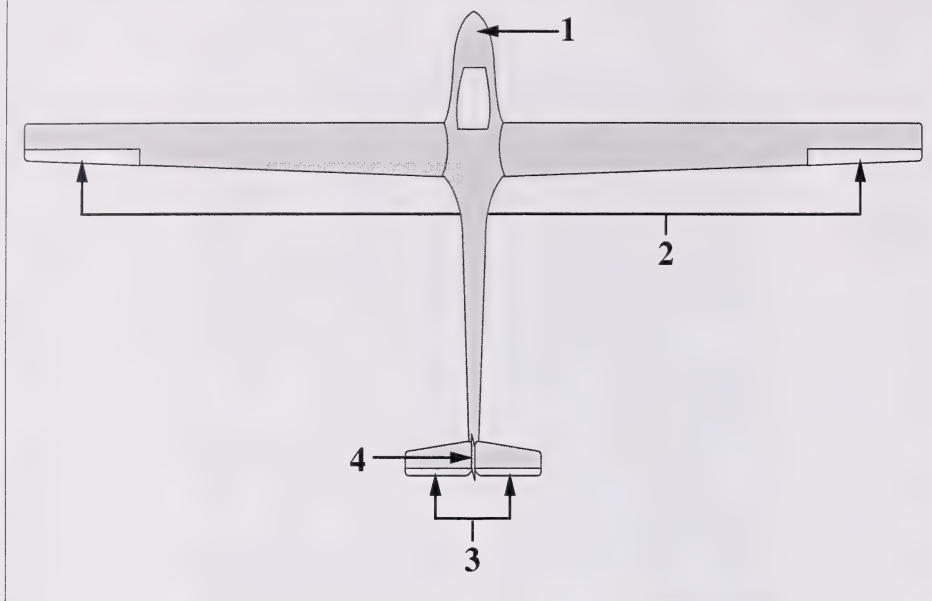
FLYING INTO AN ENVIRONMENTAL CAMP



As a member of an environment club in southern Alberta, you have been chosen to accompany a pilot working for the Alberta Environmental Protection Agency. She is flying supplies into an environmental camp in the mountains. You are very excited about this because you will have the chance to earn several badges as part of your club activities.

Use the following information to answer question 1.

Before takeoff, you noticed a glider plane being towed down the runway.



1. In order for the glider to be lifted off the ground, the position of one of its parts must be changed. This part is labelled
 - A. 1
 - B. 2
 - C. 3
 - D. 4

2. After takeoff, the pilot steadily increases the airplane's speed and altitude. For this increase to occur,
 - A. thrust must equal drag and lift must equal gravity
 - B. thrust must be greater than drag and lift must be greater than gravity
 - C. thrust must equal drag and lift must be greater than gravity
 - D. thrust must be greater than drag and lift must equal gravity

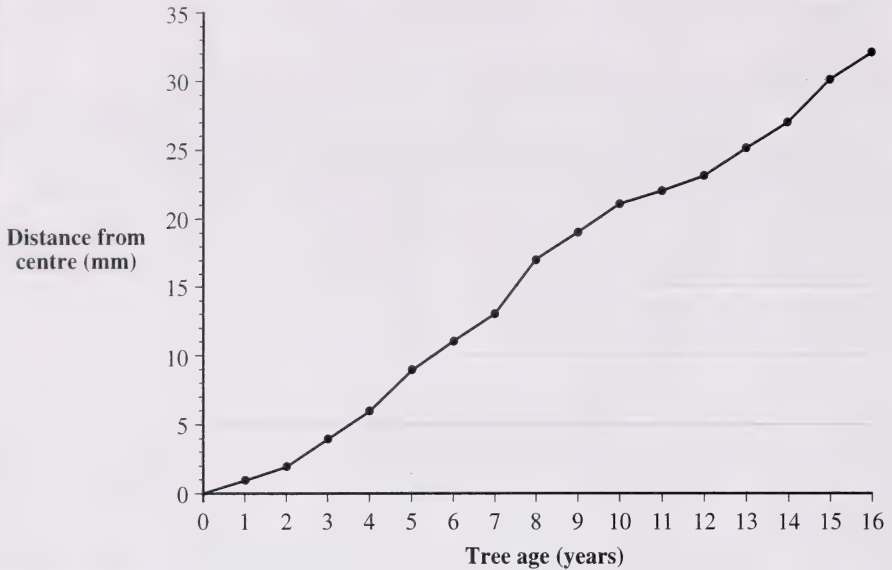
3. The pilot explains that the airplane is like a bird in that both are streamlined in order to reduce
- A. lift
 - B. weight
 - C. drag
 - D. thrust
4. The pilot explains how the airflow around a wing produces the force that holds the airplane up. The airflow is fastest
- A. behind the wing
 - B. in front of the wing
 - C. over top of the wing
 - D. underneath the wing

As the airplane approaches the landing field near the camp, you see smoke from a forest fire in the distance.

5. Once you arrive at the camp, you meet an environmental biologist who explains that forest fires are not completely bad for the environment. One way that forest fires help the environment is that they
- A. allow for the new growth of plants needed by some animals
 - B. produce a gas that reduces the greenhouse effect
 - C. make some plant species extinct, thereby allowing new ones to develop
 - D. force animals to move to other areas
6. After a forest fire, the types of animals that live in a regrowing forest are different from the types of animals that lived in the original forest. This change in the animal population **most likely** occurs because
- A. similar types of vegetation grow in the area at different times
 - B. different types of vegetation grow in the area at different times
 - C. only one type of tree grows in the area immediately after the fire
 - D. only one type of grass grows in the area long after the fire

Use the following information to answer question 7.

The biologist shows you a graph she made after looking at the growth rings of a large tree stump.



7. This graph shows that the tree grew most slowly between years

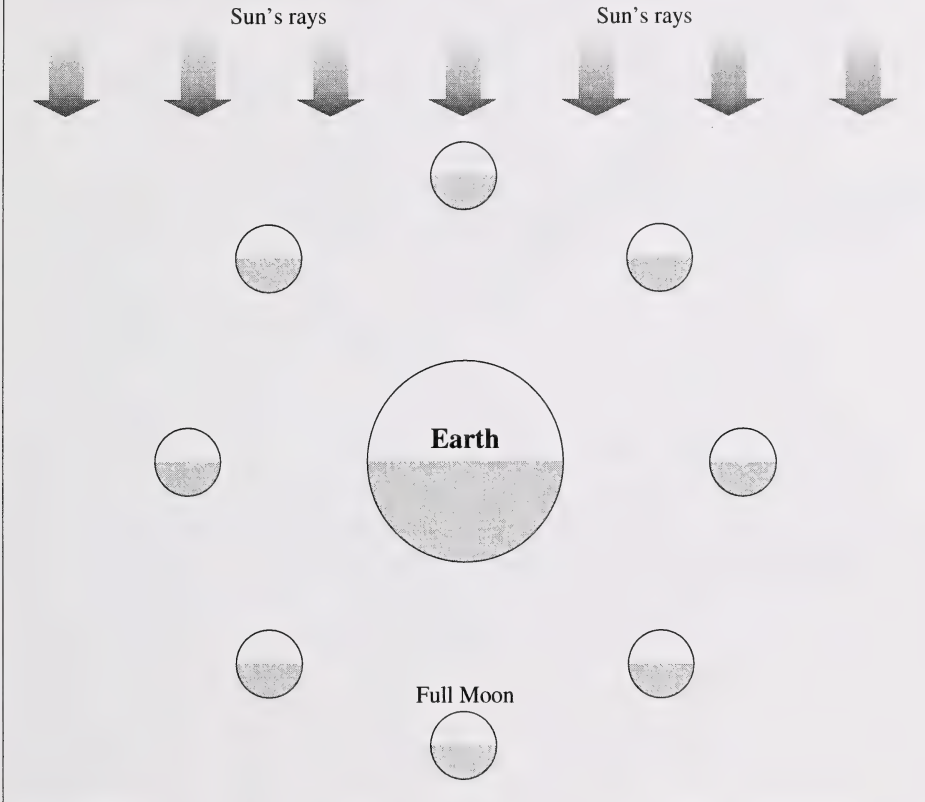
- A. 8 and 9
- B. 10 and 11
- C. 12 and 13
- D. 14 and 15

8. While looking up at the night sky, you see a bright, full moon. The biologist explains that the Moon does not light up the sky as much as the Sun does because the Moon

- A. is much farther away from Earth than from the Sun
- B. only reflects some of the light produced by the Sun
- C. is smaller than Earth
- D. only reflects light from Earth

Use the following information to answer question 9.

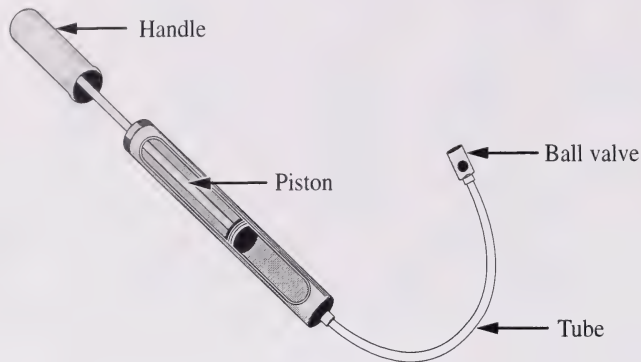
The biologist shows you a diagram in one of her textbooks. It can be used to explain the phases of the Moon over a period of one month.



9. She explains that beginning at the new moon phase, as the Moon revolves around Earth, the portion of the Moon that we see
- A. increases then decreases
 - B. decreases then increases
 - C. remains the same
 - D. disappears

Use the following information to answer question 10.

That night, you inflate your air mattress, using a hand-held pump like the one pictured below.



10. You know that the pump is designed to
- A. pump air only into bicycle tires
 - B. compress air and then allow it to flow out through the valve
 - C. heat air and then allow it to expand to fill the mattress
 - D. reduce the volume of air in the mattress so that air will fill the mattress

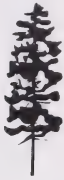
In the morning, you collect some leaves as part of a project to earn an environmental badge. The biologist gives you the chart below so that you can identify the leaves.

Use the following information to answer questions 11 to 13.

Tree Identification Chart		
Tree	Leaf Description	Tree Description
Balsam poplar	—egg-shaped with a sharp point	—long, narrow shape with large, thick, short branches
Red willow	—pointed tips —attached in alternating pattern —long and skinny	—smooth, slim twigs —straight, unbranched trunk —can be found near water
Red alder	—6 to 12 cm long with pointed tips —serrated edges	—can be shrub-like —grows on stream banks and marshes —produces catkins (cone-like structures)
Trembling aspen	—stem of leaf is longer than leaf —nearly circular with abrupt, short, sharp tip	—long trunk and short, roundish crown
White spruce	—single needle joins twig —needles are four-sided and have tiny, brown stem	—cones found only at the top
Lodgepole pine	—two needles per bunch —spiralled or twisted	—small, hard cones —tall, straight tree —older trees in groups normally have no living branches near the bottom

11. The biologist shows you some pictures of trees. After reading the chart, you realize that a trembling aspen is shown in

A.



B.



C.



D.

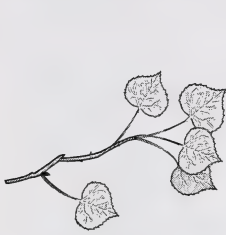


12. Near a river, the biologist shows you many trees with long, slender leaves that have been nibbled by deer. You use the chart to identify the trees as

- A. red willows
- B. balsam poplars
- C. red alders
- D. trembling aspens

Use the following additional information to answer question 13.

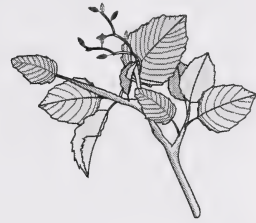
You show the biologist your leaf collection.



Trembling Aspen



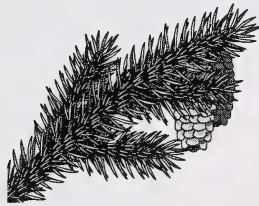
Balsam Poplar



Red Alder



Red Willow



Lodgepole Pine

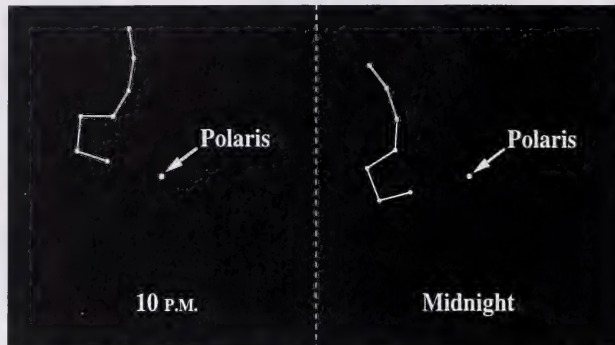


White Spruce

13. The biologist says that you have labelled two leaves incorrectly. She identifies the leaves that have been **incorrectly** labelled as the
- A. white spruce and lodgepole pine
 - B. red alder and balsam poplar
 - C. red willow and red alder
 - D. trembling aspen and balsam poplar
-
14. You and the biologist discuss how leaves produce food for trees by the process of
- A. transpiration
 - B. respiration
 - C. digestion
 - D. photosynthesis

Use the following information to answer questions 15 and 16.

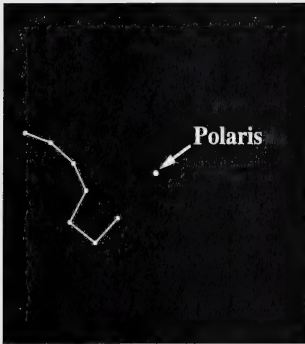
At 10:00 P.M., you notice the constellation of the Big Dipper and the star Polaris. When you wake up at midnight, you notice that the Big Dipper appears to have moved.



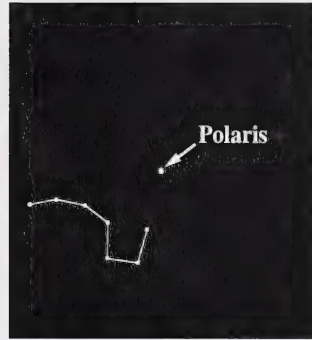
15. The reason that the Big Dipper appears to have moved is that
- A. the stars randomly change their positions
 - B. the Moon's gravity causes the stars to change their positions
 - C. Earth tilts closer to the Sun as it rotates during the night
 - D. Earth rotates on its axis as it revolves around the Sun

16. At 2 A.M., the position of the Big Dipper would be

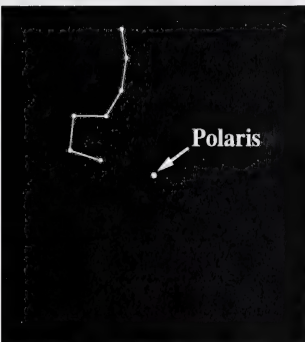
A.



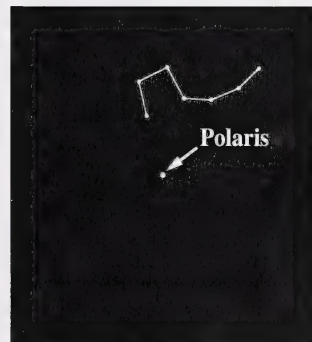
B.



C.



D.

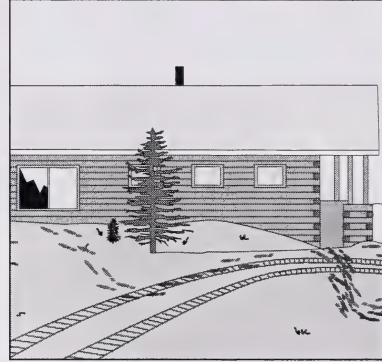


INVESTIGATING A BREAK-IN

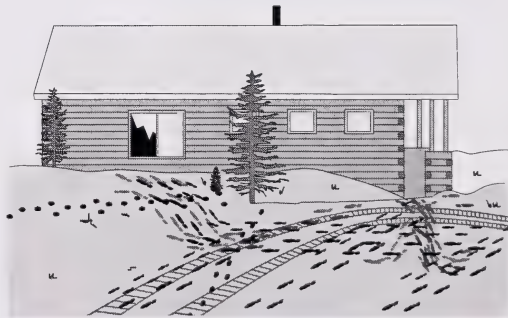
A police officer is investigating a break-in.

Use the following information to answer questions 17 and 18.

The police officer took a picture of the crime scene immediately after the break-in. However, the police officer was suddenly called away from the crime scene to assist with the investigation of a serious accident.



Later that day, the police officer returns to the scene to gather more evidence. On your way home from school, you meet the police officer. This is the scene that you and the officer see.



17. The police officer explains that footprints will be difficult to use as evidence because
- A. the original footprints have been disturbed too much
 - B. many of the footprints are not deep enough
 - C. there are too few footprints
 - D. the new footprints are not clear enough
18. As you look at the evidence, the police officer tells you that the tire tracks can be used to
- A. determine the number of people involved in the break-in
 - B. identify the tires of a suspect's vehicle
 - C. identify the make and model of the vehicle
 - D. pinpoint the exact time of the crime

Use the following information to answer question 19.

The police officer shows you the notebook he uses to record evidence for the investigation.

Evidence Record					
Date found	Time found	Type of evidence	Number of items	Tag identification number	

19. The officer tells you that he is going to label the final column with the words
- A. "Found by"
 - B. "Size of evidence"
 - C. "Location found"
 - D. "Age of evidence"



The next 2 questions are about science demonstrations and projects that you saw when you visited a school science fair in Alberta.

20. Sean demonstrated a device to show how humans breathe. He knew that for his device to show how a human breathes, it would have to
- A. use nitrogen and give off oxygen
 - B. use carbon dioxide and give off oxygen
 - C. use oxygen and give off nitrogen
 - D. use oxygen and give off carbon dioxide

Use the following information to answer question 21.

Henri investigated how the length of a shadow cast by a sundial changes throughout the day.

Time of Day	Length of the Sundial's Shadow
09:00	80 cm
10:00	70 cm
11:00	50 cm
12:00	40 cm
13:00	50 cm
14:00	?
15:00	?

21. Henri predicted that the length of the shadow cast by the sundial at 15:00 would be
- A. 50 cm
 - B. 60 cm
 - C. 70 cm
 - D. 80 cm

Key and Descriptors for Sample Questions

Item	Key	Reporting Category	Topic*	Curriculum Standard
1	C	K	AF	Identify elevators as the part that must move for a plane to take-off
2	B	S	AF	Apply knowledge of the forces acting on an airplane in flight
3	C	K	AF	Apply knowledge that drag is reduced when an object is streamlined
4	C	K	AF	Apply knowledge of Bernoulli's Principle to airflow around a wing
5	A	K	TF	Apply knowledge of how fires can help the environment
6	B	K	TF	Apply knowledge of how forests regrow after a fire
7	B	S	IPS	Interpret data presented in a line-graph to draw a conclusion
8	B	K	SS	Apply knowledge that stars produce their own light
9	A	S	SS	Infer the amount of light reflected by the phases of the moon
10	B	K	AF	Apply knowledge of how air moves from high pressure to low pressure
11	B	S	TF	Interpret a chart to match a description to a diagram of the tree
12	A	S	TF	Interpret a chart to identify a tree based on a description
13	A	S	TF	Interpret a chart to correctly identify tree leaves
14	D	K	TF	Recall knowledge of the process of photosynthesis
15	D	S	SS	Apply knowledge of Earth's rotation to the motion of the night sky
16	A	S	SS	Predict the apparent motion of constellations in the night sky
17	A	S	EI	Analyze and interpret a crime scene
18	B	K	EI	Apply observation skills to predict how evidence can be used
19	C	S	EI	Identify evidence that is important to record
20	D	K	AF	Apply knowledge that humans use oxygen and give off carbon dioxide in respiration
21	D	S	IPS	Interpret a pattern from a chart and make an inference

* IPS—Inquiry and Problem Solving
 AF—Aerodynamics and Flight
 TF—Trees and Forests

SS—Sky Science
 EI—Evidence and Investigation

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